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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/576,652	05/22/2000	Frank A. Hagen	PD-200029	3276

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HUGHES ELECTRONICS CORPORATION
PATENT DOCKET ADMINISTRATION RE/R11/A109
P O BOX 956
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EXAMINER	
DEAN, RAYMOND S	

ART UNIT	PAPER NUMBER
2684	7

DATE MAILED: 11/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No.	Applicant(s)	
	09/576,652	HAGEN ET AL.	
	Examiner	Art Unit	
	Raymond S Dean	2684	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 5, 7 - 10, and 15 -17* is/are rejected.

7)☒ Claim(s) *6, 11 - 14, and 18 -20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: 40. The applicant uses the reference number 40 for the post processor on page 13 lines 23 –26 after earlier identifying the post processor as reference number 44, which corresponds with the drawing in Figure 4. The applicant also uses the reference number 100 for intended user on page 21 lines 17 – 18 after earlier identifying the user as reference number 110. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character 106 has been used to designate both path length and satellite. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities: Page 37 lines 16 – 18 the applicant states that the UHF frequency band is 20 MHz. The UHF band is 300 – 3000 MHz. Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 7 – 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Leopold et al. (6,226,493 B1).

Regarding Claim 7, Leopold teaches a satellite constellation consisting of a plurality of satellites each in a slightly perturbed geosynchronous orbit (Column 7 lines 32 –39 Column 7 lines 46 – 63 different combinations of perturbations can be made with varying numbers of satellites) each of said plurality of satellites being capable of relaying signals between the ground hub and the plurality of user terminals in either direction (Column 5 lines 21 – 28 Column 5 lines 39 – 42) whereby as said satellite constellation appears to rotate the apparent inter-satellite spatial relationships are maintained (Fig. 3, Column 7 lines 5 – 18 the satellites must remain within their orbital slots therefore the distances between them will be relatively constant and the spatial relationships between the satellites are maintained as the constellation moves).

Regarding Claim 8, Leopold teaches all of the claimed limitations recited in Claim 7. Leopold further teaches each said plurality of satellites has its inclination and eccentricity perturbed relative to a common geosynchronous reference orbit (Fig 4 shows the perturbed satellites sharing a common geosynchronous orbit Column 7 lines 32 – 39 Column 7 lines 46 – 63).

Regarding Claim 9, Leopold teaches all of the claimed limitations recited in Claim 8. Leopold further teaches the orbit of each of said plurality of satellites is perturbed such that it appears to move at a constant speed along a circular path as viewed by a single user (Column 7 lines 46 – 63 the perturbations can be made such that the satellites have circular paths, geosynchronous orbits are in sync with the revolution of the earth thereby manifesting an inherent characteristic of satellites traveling at a constant speed).

Regarding Claim 10, Leopold teaches all of the claimed limitations recited in Claim 7. Leopold further teaches the respective distances among the said plurality of satellites are substantially constant (Fig. 3, Column 7 lines 5 – 18 the satellites must remain within their orbital slots therefore the distances between them will be relatively constant).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1 - 5, 15 – 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weinberg (5,589,834) in view of Leopold et al. (6,226,493 B1).

Regarding Claim 1, Weinberg teaches a method for transmitting communications signals to a plurality of mobile terminals, comprising: processing a received signal at a ground hub; radiating said signal through multiple paths to at least two satellites; re-radiating said signal from said at least two satellites to an intended mobile terminal (Fig 2 shows a mobile terminal, Column 3 lines 58 – 67 Column 4 lines 1 - 8 this method is the "bent pipe" method as described by applicant, Column 2 lines 43 – 47 Column 7 lines 23 - 28 there are a total of six satellites from which to re-radiate signals from the ground).

Weinberg does not specifically teach perturbing the inclination and eccentricity of said at least two satellites relative to the same geosynchronous reference orbit; whereby the periods of geosynchronous orbits of said at least two satellites remain substantially constant.

Leopold teaches a geosynchronous system where the inclination and eccentricity of at least two satellites are perturbed relative to the same geosynchronous orbit (Fig 4 shows the perturbed satellites sharing a common geosynchronous orbit, Column 7 lines 32 – 39 Column 7 lines 46 – 63, it is an inherent characteristic of geosynchronous satellite systems that the orbit periods are constant because the satellites move in sync with the revolution of the earth).

Weinberg teaches a geosynchronous satellite system with inclined orbits to overcome obscura or signal blockage (Column 2 lines 37 – 47) therefore it would have been obvious to one skilled in the art at the time the invention was made to use the method of perturbing the inclination and eccentricity taught in Leopold in the system taught in Weinberg in order to optimize the geosynchronous satellite communication system taught in Weinberg such that it is a system completely immune to obscura or signal blockage.

Regarding Claim 2, Weinberg in view of Leopold teaches all of the claimed limitations recited in Claim 1. Weinberg teaches radiating a signal from said intended mobile terminal to at least two satellites and re-radiating said signal from said at least two satellites (Column 3 lines 58 – 67 Column 4 lines 1 - 8 this method is the "bent pipe" method as described by applicant, Column 2 lines 43 – 47 Column 7 lines 23 - 28 there are a total of six satellites from which to re-radiate signals from the ground).

Weinberg does not specifically teach two perturbed satellites.

Leopold teaches a geosynchronous system that has at least two perturbed satellites (Fig 4 shows two perturbed satellites, Column 7 lines 32 – 39).

Weinberg teaches a geosynchronous satellite system with inclined orbits to overcome obscura or signal blockage (Column 2 lines 37 – 47) therefore it would have been obvious to one skilled in the art at the time the invention was made to use the method of perturbing the inclination and eccentricity taught in Leopold in the system taught in Weinberg in order to optimize the geosynchronous satellite communication

system taught in Weinberg such that it is a system completely immune to obscura or signal blockage.

Regarding Claim 3, Weinberg in view of Leopold teaches all of the claimed limitations recited in Claim 2. Leopold further teaches determining a relationship between said inclination and said eccentricity of said satellites such that they appear to move at a constant speed along circular paths whose centers are located at the position of a hypothetical reference satellite in an unperturbed geosynchronous orbit (Fig 4 shows the perturbed satellites sharing a common geosynchronous orbit, Column 7 lines 32 – 39 Column 7 lines 46 – 63 the perturbations can be made such that the satellites have circular ground paths, geosynchronous orbits are in sync with the revolution of the earth thereby manifesting an inherent characteristic of satellites traveling at a constant speed).

Regarding Claim 4, Leopold teaches all of the claimed limitations recited in Claim 3. Leopold further teaches maintaining the geometry of said cluster of at least two satellites such that the distances between any two of said satellites are relatively constant (Fig. 3, Column 7 lines 5 – 18 the satellites must remain within their orbital slots therefore the distances between them will be relatively constant).

Regarding Claim 5, Leopold teaches all of the claimed limitations recited in Claim 4. Leopold further teaches adding additional satellites to said at least two satellites to augment the satellite constellation (Column 5 lines 47 – 49).

Regarding Claim 15, Weinberg teaches preprocessing a received signal at the ground hub and transmitting said signal through a plurality of satellites in a satellite

constellation to an intended one of the mobile terminals (Fig 2 shows a mobile terminal, Column 3 lines 58 – 67 Column 4 lines 1 – 8 Column 7 lines 23 –28).

Weinberg does not specifically teach perturbing the inclination and eccentricity of said plurality of satellites relative to a common geosyngchronous reference orbit and determining a relationship between said inclination and said eccentricity of said plurality of satellites such that they appear to move at a constant speed along circular paths where centers are located at a position defined by a hypothetical reference satellite in an unperturbed geosynchronous orbit.

Leopold teaches perturbing the inclination and eccentricity of said plurality of satellites relative to a common geosyngchronous reference orbit and determining a relationship between said inclination and said eccentricity of said plurality of satellites such that they appear to move at a constant speed along circular paths where centers are located at a position defined by a hypothetical reference satellite in an unperturbed geosynchronous orbit (Fig 4 shows perturbed satellites sharing a common geosynchronous orbit, Column 7 lines 32 – 39, Column 7 lines 46 – 63 the perturbations can be made such that the satellites have circular ground paths, geosynchronous orbits are in sync with the revolution of the earth thereby manifesting an inherent characteristic of satellites traveling at a constant speed).

Weinberg teaches a geosynchronous satellite system with inclined orbits to overcome obscura or signal blockage (Column 2 lines 37 – 47) therefore it would have been obvious to one skilled in the art at the time the invention was made to use the method of perturbing the inclination and eccentricity taught in Leopold in the system

taught in Weinberg in order to optimize the geosynchronous satellite communication system taught in Weinberg such that it is a system completely immune to obscura or signal blockage.

Regarding Claim 16, Weinberg in view of Leopold teaches all of the claimed limitations recited in Claim 15. Leopold further teaches maintaining the periods of geosynchronous orbit of said plurality of satellites substantially constant (Fig. 3, Column 7 lines 5 – 18 the satellites must remain within their orbital slots therefore the distances between them will be relatively constant and the speed of the satellites will be relatively constant, these two constants coupled with the fact that they are geosynchronous orbits manifest inherent constant orbital periods).

Regarding Claim 17, Weinberg in view of Leopold teaches all of the claimed limitations recited in Claim 15. Leopold further teaches maintaining the apparent inter-satellite spatial relationships between said plurality of satellites as they appear to rotate (Fig. 3, Column 7 lines 5 – 18 the satellites must remain within their orbital slots therefore the distances between them will be relatively constant and the spatial relationships between the satellites are maintained as the constellation moves).

Allowable Subject Matter

7. Claims 6, 11 - 14, and 18 – 20 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding Claims 6, 11, and 18 Leopold teaches different combinations of perturbing the satellites in a constellation such that they have a circular motion relative to a common reference geosynchronous orbit (Fig 4 shows satellite constellation with perturbed satellites sharing a common geosynchronous orbit Column 7 lines 32 – 39 Column 7 lines 46 – 63 the perturbations can be made such that the satellites have circular ground paths) but the prior art of record fails to show the conditions for this circular motion being approximated by sin i = 2Epsilon, tsub0=+/-1/4TsubGEO.

Regarding Claim 12, It is well known in the art that down link signals intended for specific users must be coherently detected by said user in an environment where there are multiple signals and multiple users but the prior art of record fails to show that in order for an intended user to receive signal coherently the user's location must be determined to within a specified tolerance according to the following equation: Sigmasubx << Sigmasubtol Lambdasubmin rsubmin / DeltaDsubrmax.

Regarding Claims 13 and 19, It is also well known in the art that down link signals not intended for specific users (interferers) must be rejected by said user in an environment where there a multiple signals and multiple users but the prior art of record fails to show that in order for this interference rejection to occur the interfering users must be displaced at least a distance:
DeltaXsubmin >/= Crsubmax / 2WsubN Epsilon DeltaDsubxmin

Regarding Claim 14, Leopold teaches the motions of a plurality of satellites in a satellite constellation can be arranged to appear circular as perceived from any one point in the coverage area (Column 7 lines 46 – 63 the perturbations can be made such that the satellites have circular ground paths and therefore can be viewed as circular from a point on the ground in the coverage area) but Claim 14 is dependent on Claim 11 therefore examiner gives the same reason as set forth above.

Regarding Claim 20, It is well known in the art that down link signals intended for specific users must be coherently detected by said user in an environment where there are multiple signals and multiple users but the prior art of record fails to show that in order for an intended user to receive signal coherently the user's location must be determined to within a specified tolerance according to the following equation: Sigmasubx << Sigmasubtol Tausubmin rsubmin / Deltasubxmin

Conclusion

8. Any inquiry concerning this communication should be directed to Raymond S. Dean at telephone number (703) 305-8998.

If attempts to reach examiner by telephone are unsuccessful, the examiner's supervisor, Nay Maung, can be reached at (703) 308-7745. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

Or faxed to:

(703) 872-9314 (for Technology center 2600 only)

Hand – delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist). Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377

NAY MAUNG
SUPERVISORY PATENT EXAMINER